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Artificial intelligence and semiotics, or Methods for production of bridges between traditional and digital humanities

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Abstract

Paper defends the thesis that majority of artificial intelligence models are mathematic-based or logic-based. Such models are discussed within so-called digital humanities. But none of these discussions can finally answer, is whether the artificial intelligence can be not only just like natural intelligence. This is the philosophical question and only philosophers can answer it. But general philosophy has no any opportunities to construct rigorous knowledge just like mathematics and formal logic do it. We suppose that philosophy is the field of discussions and each of these discussions can lead only to constructing the phenomenological kinds of interpretations as special scope of human activity. Our article makes clear one of the ways of phenomenological model of artificial intelligence constructing. That model can be constructed on the base of semiotic approach, and all of that can help to elaborate methods for production of bridges between traditional and digital humanities.

keywords

artificial intelligence; naturalistic position; general phenomenological model; semiotics; traditional humanities; digital humanities.

INTRODUCTION

Our knowledge of intelligence includes very important limits. We approximately know the structure of natural intelligence, but we don't know how can be constructed the alternative kind of intelligence. That's why models of artificial intelligence historically were building as the analogy of natural intelligence, and most of them have the mathematic-based or logic-based (i.e. "naturalistic") kind of view [Feldman and Domshlack, 2014; Gent, 2013; Kotthoff, 2014].

Saul Kripke, Richard Rorty and other thinkers of the XXth century have shown how the alternative kind of mind, feeling, etc. could exist. But every time it was the alternative only for *our*, i.e. *human* mind, feelings, etc. [Kripke, 1980: 144-155; Rorty, 1979: 70-86]. It wasn't an absolut different kind of intelligence (like intelligence of God comparing to human intelligence in Middle Ages). So, Rorty demonstrated the example of special race which had no idea of Mind:

The language, life, technology, and philosophy of this race were much like ours. But there was one important difference. Neurology and biochemistry had been the first disciplines in which technological breakthroughs had been achieved, and a large part of the conversation of these people concerned the state of their nerves. When their infants veered toward hot stoves, mothers cried out, "He'll stimulate his C-fibers" [Rorty, 1979: 71].

An example shows that whether we've got or we've got no anything like "mind", we always have some cognition structures which could help us to build civilization. And that civilization will be similar for civilization which was built by human mind. To find the way out we must elaborate some principles of general phenomenological model of artificial intelligence building.

For clearing of prospects to creation of the generalized phenomenological model of artificial intelligence we treat the analysis of the principles on which the understanding of self-organization of social and cultural systems is based and which coincide with a number of the semiotics ideas put forward by Juri Lotman and Boris Uspensky. We suppose, it can help to elaborate methods for production of bridges between traditional and digital humanities.

I. ARTIFICIAL INTELLIGENCE AND PRINCIPLES OF SEMIOTICS

So, we are using semiotic approach. The strength of semiotics interpretation of culture is opportunity to present mankind history like some kind of interaction. Within it was connected the ways of replacement of natural reality by secondary models of this reality. In particular, cultural and historical development can be interpreted as functioning of the literary (textual) systems expressing fundamental versions of the relations of the person to the world. All of that gives a hope to open new opportunities within the process of general phenomenological model of artificial intelligence building.

Lotman and Uspensky develop the line of researches previously laid in Ferdinand de Saussure's works. Saussure maintained three important theses:

(1) language is the social phenomenon;

(2) language is the sign system;

(3) there is common science for both fields (for language and society) [Saussure, 1997: 32].

Lotman notices following:

...the individual act of sign exchange has come to be regarded as a model of natural language, and models of natural languages – as universal semiotic models, whereas semiotics itself has sought to be understood as the extension of linguistic methods to objects not included in traditional linguistics. This approach, originating with Saussure, was expressed with maximum clarity by the late I. I. Revzin who, during discussions at the second Summer school on secondary modelling systems in Kääriku (1966), proposed the following definition: *The subject of semiotics is any object, which acts as a means of linguistic description* [Lotman, 2005: 206].

Without any doubts culture is a result of human activity and it has a linguistic description. That's why semiotic approach could be applied to culture. From that point of view the culture is the sign system. But from this is also clear the potential of understanding of reality connected with culture through “prism” of set of signs and sign systems.

What it gives for solving the problem of general phenomenological model of artificial intelligence?

II. ARTIFICIAL INTELLIGENCE AND DIMENSIONS OF RATIONALITY

Heuristic potential of culture understanding like sign systems reveals the possibility of clearing of some fundamental qualities and properties of the human communication as a certain position in the relation to the world during a concrete historical era. Variants of world meaning signification represent the kinds of world understanding. Systematization of these ways allows to create the generalized image of abilities of the person generating these ways and also to find out the world understanding replaced with concrete set of signs and sign systems.

The understanding of the social and cultural phenomena as sign systems allows interpreting in special way specifics of the modern rationality as natural so artificial. This way leads to new understanding of artificial intelligence within generalization of intelligence interpretation.

But at first it is necessary to pay attention on some work of Jacques Derrida. In particular, Derrida notices that the traditional judgment of knowledge bases historically takes place within logical researches of human reason [Derrida, 1967: 12]. In XXth century the kernel of reason question and problem of rationality at all acts in the form of “writing problem”, because

...le concept d'écriture excède et comprend celui de langage. On disait “langage” pour action, mouvement, pensée, réflexion, conscience, inconscient, expérience, affectivité, etc. On tend maintenant à dire “écriture” pour tout cela et pour autre chose [Derrida, 1967: 18-19].

Thus, the modern researchers make a turn from logic to more fundamental problem entitled “problem of language” and its practical aspects. During allocation of the bases of the general science about the writing (or “grammatology”) Derrida comes to a following conclusion:

La science de l'écriture devrait donc aller chercher son objet à la racine de la scientificité. L'histoire de l'écriture devrait se retourner vers l'origine de l'historicité. Science de la possibilité de la science? Science de la science qui n'aurait plus la forme de la *logique* mais de la *grammatique*? Histoire de la possibilité de l'histoire qui ne serait plus une archéologie une philosophie de l'histoire ou une histoire de la philosophie? [Derrida, 1967: 43]

The analysis of the status of a grammarology as scientific discipline [Derrida, 1967: 121] convincingly shows:

Depuis plus d'un siècle, on peut percevoir cette inquiétude de la philosophie, de la science, de la littérature dont toutes les révolutions doivent être interprétées comme des secousses détruisant peu à peu le modèle linéaire. Entendons le modèle *épique*. Ce qui se donne aujourd'hui à penser ne peut s'écrire selon la ligne et le livre, sauf à imiter l'opération qui consisterait à enseigner les mathématiques modernes à l'aide d'un boulier [Derrida, 1967: 130].

From this is clear that in the context of ideas of time linearity the grammarology which traditionally was built as historical typology of writing was impossible as positive science. And the preconditions connected with transformation of scientific knowledge into a kind of literary practice are caused by existence of intentions which is mediated by linguistic model of research practice and at the center of which was ideas of nonlinearity of time and the writing.

And exactly such meaning of scientific thought, human reason and rationality at all as kinds of sign systems leads to rather unexpected results in interpretation of intelligence's general forms of understanding.

Roland Barthes establishes that there are no basic obstacles that scientific thought become an element of mythological practice within public consciousness. As a characteristic example transformation of "Einstein's brain" into mythical object acts. Barthes notes that

...paradoxalement, la plusgrande intelligence forme l'image de la mécanique la mieux perfectionnée, l'homme trop puissant est séparé de la psychologie, introduit dans un monde de robots. ... Peut-être à cause de sa spécialisation mathématique, le surhomme est ici dépouillé de tout caractère magique; en lui aucune puissance diffuse, aucun mystère autre que mécanique : il est un organe supérieur, prodigieux, mais réel, physiologique même [Barthes, 1957: 85].

The idea of conditionality of social and lexical practice by the political relations as the relations of domination and submission follows from all of this. It is connected with special type of society, namely anonym and bourgeois society which development causes totality of a mythology as daily so scientific reality. The bourgeois reality is subordinated to special kind of rationality, the rationality of Fiction and Rhetoric which overcoming is possible only within literature and especially in poetry.

As logical completion of Barthes's views acts the idea of mutual converting of sense and nonsense. That idea was put forward by Gilles Deleuze and in his works converting of sense and nonsense was carried out on condition of that:

Quand nous supposons que non-sens dit son propre sens, nous voulons indiquer au conuaire que le sens et le non-sens ont un rapport spécifique qui ne peut pas être décalqué sur le rapport du vrai et du faux, c'est-à-dire qui ne peut pas être conçu simplement comme un rapport d'exclusion. C'est bien le problème le plus général de la logique du sens: à quoi servirait de s'élever de la sphère du vrai à celle du sens si c'était pour trouver entre le sens et le non-sens un

rapport analogue a celui du vrai et du faux?. ... La logique du sens est necessairement determinee a poser enue le sens et le non-sens un type original de rapport intrinseque, un mode de copresence, que nous pouvons seulement suggerer pour le moment en traitant le non-sens comme un mot qui dit son propre sens [Deleuze, 1969: 85].

Besides that “l'evenement n'est pas ce qui arrive (accident). Il est dans ce qui arrive le pur exprimй qui nous fait signe et nous attend“ [Deleuze, 1969: 175]. In such context promotion the thesis that scientific thought as the phenomenon making some sense is no more than set of the moments of chaos of creative thinking is justified.

So, we come to a conclusion that at the heart of rationality which externally can quite look as set of formal and logical operations internally the myth and art creativity is found.

III. MODELING OF ARTIFICIAL INTELLIGENCE AND KEY ROLE OF CULTURAL SIGNS

Untraditional reading of intelligence can be correlated to the understanding of culture offered by Lotman as “the device developing information”. In respect of “material execution” this device coincides with a natural language which

...supplies members of collective with intuitive feeling of degree of structure, it the obvious systematic (at least at the lowest levels), the transformation of the “open” world of realities to the closed world of names forces people to treat as structure of the phenomenon of such order which degree of structure, at best, is not obvious. ... The presumption of degree of structure developed as a result of skill of language communication makes powerful organizing impact on all complex of communicative means [Lotman and Uspensky, 1993: 328].

Technological metaphors for the description of the main functions of culture are attracted by Lotman and Uspensky as means of a description of culture in its historical development. But it could be realized also as sets of the signification variants within the modern communications.

That's why this reception should not mean statements about semiotics affinity of culture only with a century of total domination of technical equipment. During a pre-technological era the culture structured processes of understanding of world by language and its signs. Also culture provided progress of this understanding and systematization of processes of such progression. The role of “devices” (in strict sense) in an era of the Middle Ages, Antiquity and other periods was played by texts.

By the way, the culture as “device” and the culture as “text” are not antipodes. Technological scheme play the cornerstone for concrete device as its embodiment. It could be correlated with the role of rules of text's drawing up. Lotman and Uspensky explain the specified thought as follows:

The culture in general can be presented as set of texts; however from the point of view of the researcher to speak about culture as about the mechanism creating set of texts and about texts as about realization of culture more precisely. ... Speaking about opposition of the text and rules in relation to culture, it is important to mean, by the way, that in certain cases the same elements of culture can act in both functions [Lotman and Uspensky, 1993: 332-333].

So, the idea of the device (or idea of "mechanism") executed on the basis of some technological scheme (i.e. rules of own creation) coincides with attempt to correlate traditional options of interpretation of culture to modern ways of interpretation. It's opened the prospect to representation of any phenomena of culture like some order born from chaos. In this case it is possible to understand as "chaos" not only total absence of an order, but also comparison of separate types of order with each other from positions of their relative randomness. In other words, process of a structuring not necessarily follows the valid chaos. From such point of view it is possible to represent any mismatch of two ways of a structuring where any preceding emergence of a new order is chaos, and any new structure is an order only concerning the predecessor and can be precisely so associated with chaos in respect of own "successor".

But very special role in culture is played by social and cultural codes. Such codes are found in a situation where ciphered information confronts non-ciphered information. Each coding is the codification only for another kind of coding, but every time exist some addressee who owns a key to original codification. For that addressee the ciphered "message" is non-ciphered. Such addressee is able to lead the message within specifically made sign systems to the standard designations.

Understanding of culture within semiotics helps to find a specific interpretation of culture like some kind of "memory". Lotman and Uspensky noticed: "We understand culture as not hereditary memory of collective which is expressed in a certain system of a ban and instructions" [Lotman and Uspensky, 1993: 328-329]. Thereby, the culture can be understood not only by analogy with the devices making information, but also with the devices storing information.

Interpretation of culture as "memory" allows raising a question of translation rules of the existing cultural experience in text forms. Lotman and Uspensky noticed:

Existence of culture means creation of system of translation rules of a first-hand experience in the text. In order that this or that historical event was placed in a certain cell, it has to be realized as existing, i.e. it should be identified with a certain element in memory language. Further it has to be estimated in the relation to all hierarchical communications of this language. ... The long term of texts forms the hierarchy which is usually identified with hierarchy of values in culture. Texts extremely durable can be considered the most valuable [Lotman and Uspensky, 1993: 329-330].

And now it's clear that technological metaphors move authors to build an image of culture by analogy with the computer demanding programming. That's why cultural signs play key role within building of general phenomenological model of artificial intelligence. Cultural signs help to show a secondary character of artificiality in the concept "artificial intelligence". We can also tell that in such way intelligent activity might be described even same as natural activity, because it is not clear whether natural or artificial by nature appearance we get when we speak about artificial intelligence in its view as cultural phenomenon. Future studies will show this.

Conclusion

Results of research allow revealing new opportunities of creation of the generalized phenomenological model of artificial intelligence on the basis of semiotics. We've recognized that artificial intelligence can be strictly interpreted as a special sign system. But if in

traditional meaning such system was estimated only as simulated kind of complex of signs, then now we knew that there's no any irresistible limit to see such complex as a natural phenomenon. Semiotical approach helps to find the reason of such interpretation. Contemporary philosophical researchers have demonstrated yet that human nature was laid in the base of artificial intelligence. Besides we've seen the conflict between logical (formal) order and inner qualities of intelligence activity at all. But only in semiotic researches culture was interpreted as the rationality making machine and it was found that human activities at all depend on working of such machine. So, if we present the artificial intelligence as a special kind of culture, then we can find the methods for production of bridges between traditional and digital humanities.

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